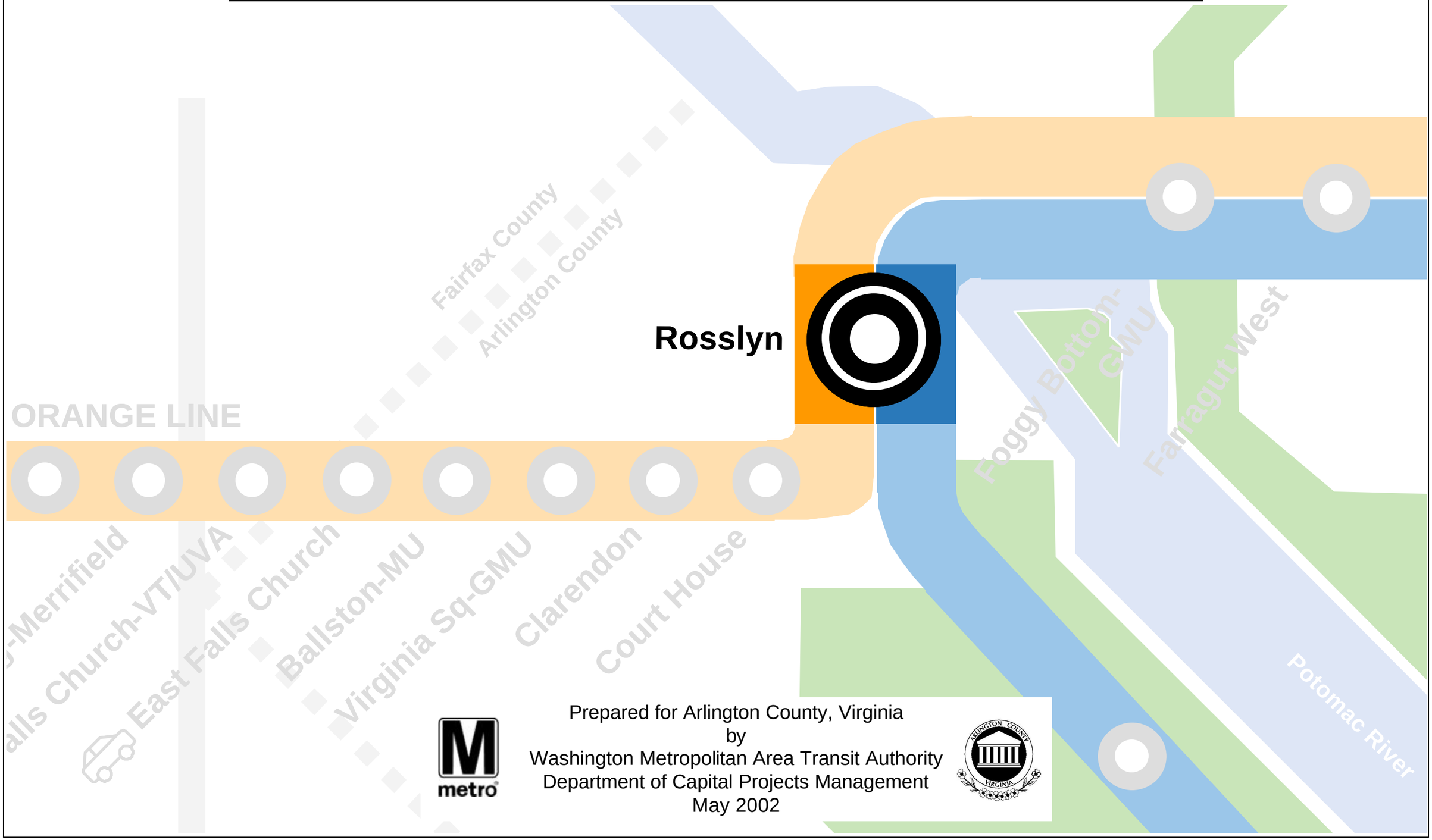
# ROSSLYN METRORAIL STATION ACCESS STUDY




Prepared for Arlington County, Virginia
by
Washington Metropolitan Area Transit Authority
Department of Capital Projects Management
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# ROSSLYN METRORAIL STATION ACCESS STUDY

## Contents



Note: The report has been prepared to demonstrate the feasibility of the concept presented. The concept is subject to further refinement and may be revised during future planning and/or engineering design phases of the project. The environmental planning process may include one or more of these alternatives along with others prior to any decision regarding implementation of a specific plan, which will be subject to professional engineering design principles.

## Figures



## Tables

# ROSSLYN METRORAIL STATION ACCESS STUDY

## Introduction

The Rosslyn Metrorail station is located in northeastern Arlington County, Virginia and serves the surrounding neighborhoods of mostly high-density, mixed commercial and residential land use. Rosslyn is home to about 11,000 residents and over 33,000 employees on weekdays.

The Metrorail station serves both Orange and Blue Line trains and is the westernmost transfer point between the two lines on the Metrorail system operated by the Washington Metropolitan Area Transit Authority (WMATA). Figure 1 depicts an aerial photograph of the station vicinity.

The study was conducted for WMATA and Arlington County to identify and evaluate potential access improvements to the Rosslyn station and generally maximize the attractiveness of Metrorail as a service to the northeastern portion of Arlington County. The study objective was to identify specific station and site improvements for pedestrian convenience and safety in accessing the station. The access improvements proposed in the study include additional station entrances and mezzanines, improved intermodal traffic conditions in the area surrounding the station, improved traffic operations on adjacent streets, and improved connections between Metrobus and Metrorail.

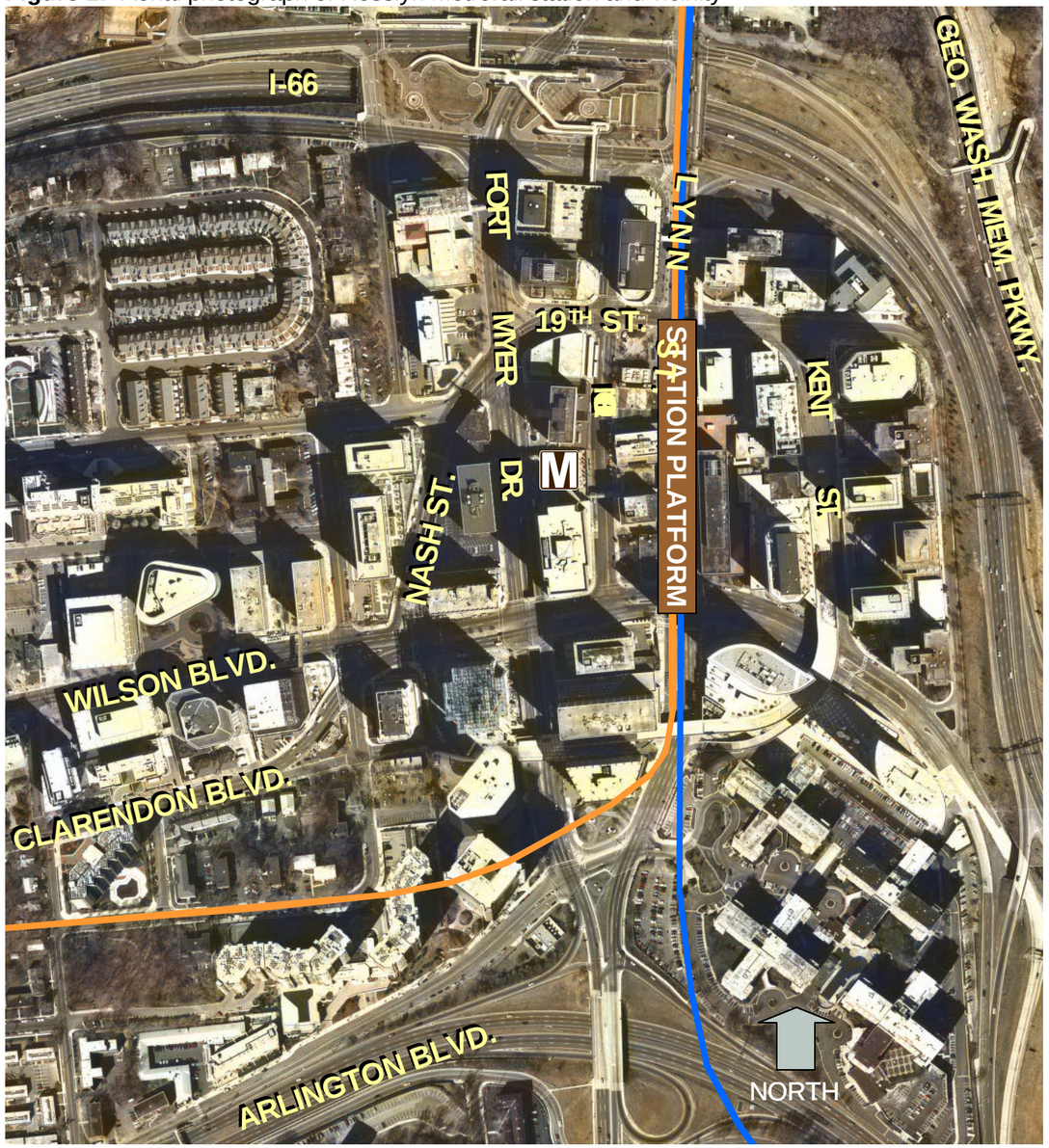
## Existing Conditions

### *Transportation Facilities*

The Rosslyn station is conveniently located near several major regional transportation corridors including Interstate 66, U.S. Route 50 (Arlington Boulevard), U.S. Route 29 (Lee Highway), and the George Washington Parkway.

Wilson Boulevard is a two-way, east-west arterial street near the Rosslyn station. Wilson Boulevard has two lanes in each direction and runs from near the Potomac River to the Fairfax County line. North Lynn Street and North Fort Myer Drive form a one-way, north-south arterial street pair connecting Rosslyn with Key Bridge and the District of Columbia. North Moore Street is a local two-way, north-south street connecting Wilson Boulevard and Lee Highway. Nash Street, 19th Street, Key Boulevard and Oak Street are other minor streets surrounding the station that provide local access.

**Figure 1:** Aerial photograph of Rosslyn Metrorail station and vicinity



# ROSSLYN METRORAIL STATION ACCESS STUDY

The Rosslyn station has a single entrance, located within the Rosslyn Metro Center Building north of Wilson Boulevard between Fort Myer Drive and Moore Street. The station platform is under Lynn Street, but because the Metrorail line is in a deep tunnel through Rosslyn, the slope of the escalators between the platform level and the surface required the entrance to be west of the platform location. Metrorail customers can reach this entrance from Moore Street, by a narrow stair from Fort Myer Drive, by a set of escalators from the skywalk system, and from the retail area within Rosslyn Metro Center. The entrance has four escalators between the surface and platform level and an elevator that reaches the surface on the east side of Moore Street. A diagram of the station area is shown in Figure 2.

**Figure 2:** Schematic diagram of Rosslyn Metrorail station and vicinity

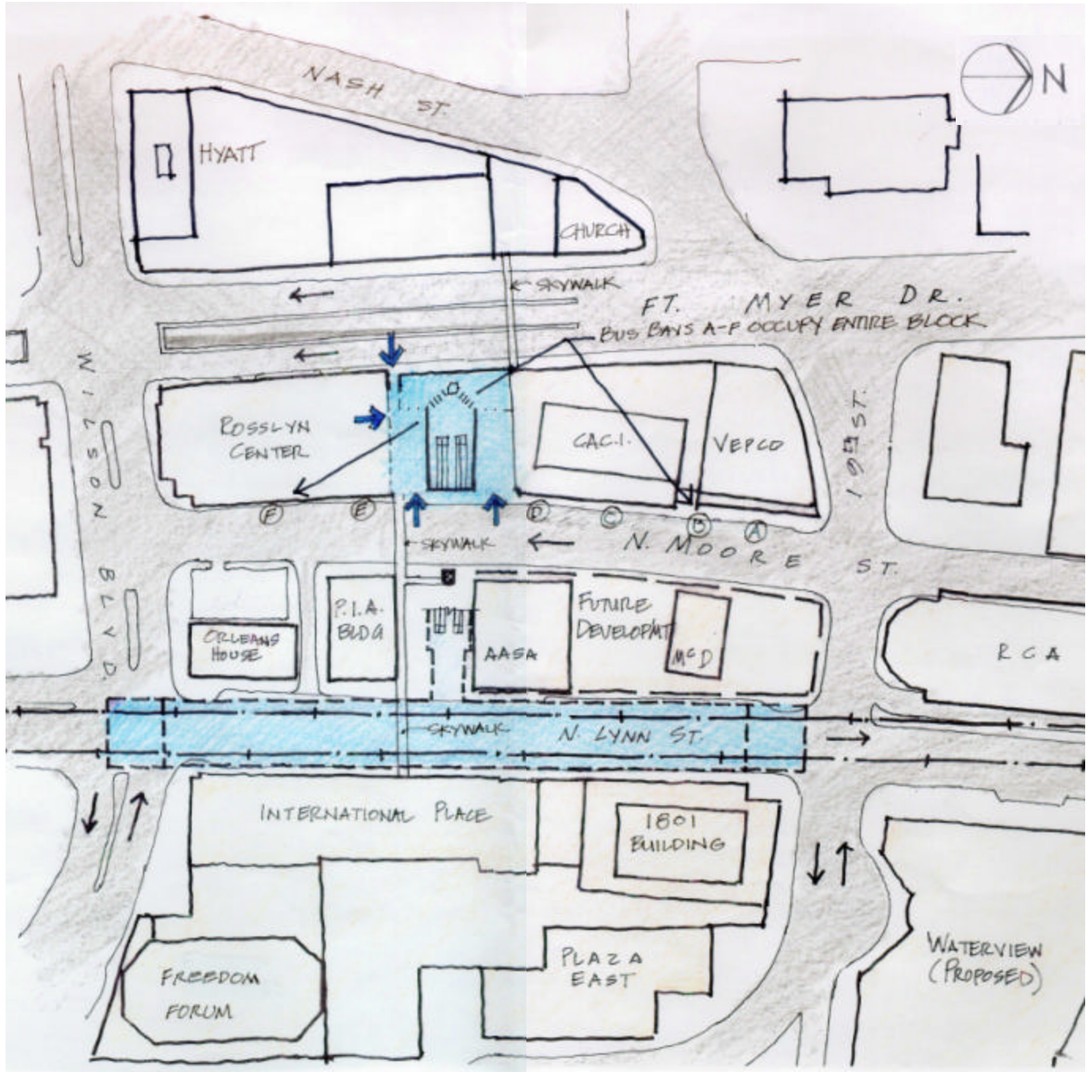
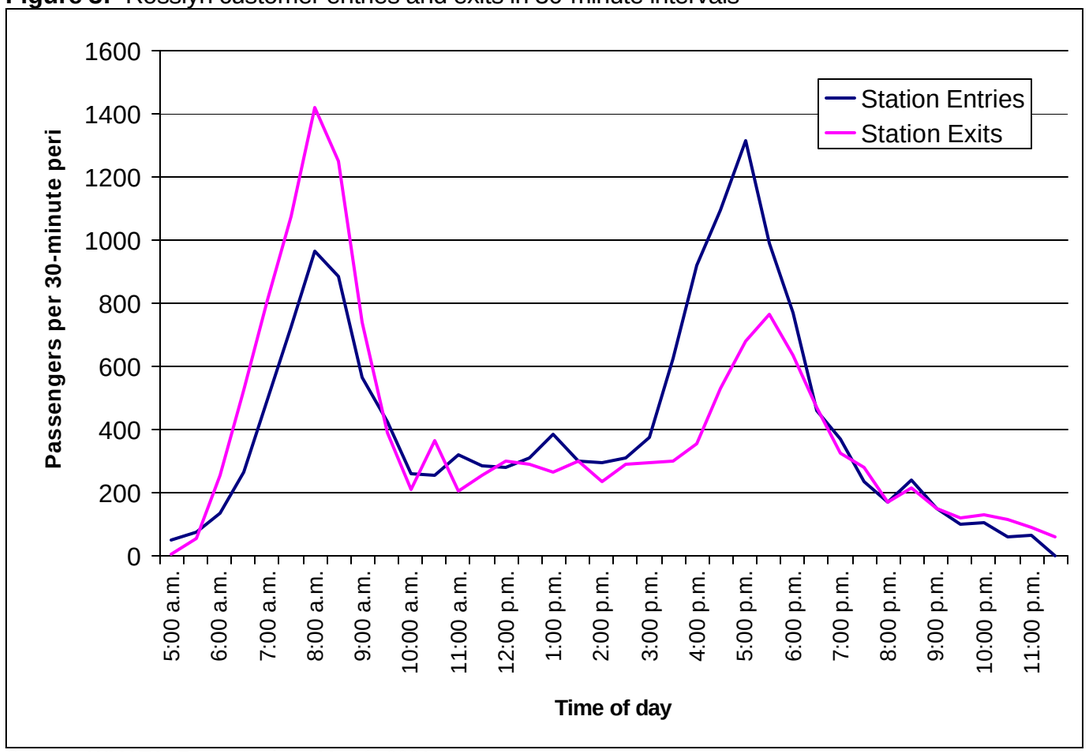



**Figure 3:** Rosslyn customer entries and exits in 30-minute intervals




Source: WMATA, Faregate data, May 9, 2001

The Rosslyn Metrorail station currently averages about 15,300 customers per day, which means that about 15,300 customers enter the system at the station and about the same number exit the system at the station. In addition, about 8,100 customers per day transfer between the Orange and Blue lines at the station. During the morning peak period, 5:30 to 9:30 a.m., about 38,900 customers pass through the station on either the Orange or Blue lines in the peak, inbound, direction. Of the 83 stations in the Metrorail system, Rosslyn ranks 11th by daily customer entries and exits.

# ROSSLYN METRORAIL STATION ACCESS STUDY

Customer traffic is highly directional at the Rosslyn station, with about twice as many customers entering the station in the evening peak as in the morning peak. Figure 3 shows customer entries and exits in half-hour intervals.

The Rosslyn Kiss & Ride area is limited to a relatively small curbside length at the secondary entrance to the station on Fort Myer Drive. Like most urban stations, Rosslyn has no Kiss & Ride parking spaces.

***Bus Facilities***

Buses serve the Rosslyn station from the west curbside of Moore Street along the station entrance frontage. The station is a stop for seven Metrobus lines, one Fairfax Connector line, and various shuttle buses, including the Georgetown Metro Connection, Georgetown University Shuttle (GUTS), and State Department shuttles. About 25 shuttles per hour access the Rosslyn station during morning and evening peak hours.

Six bus bays along the west side of Moore Street serve all the Metrobus routes and most of the shuttle routes. The Metrobus bays were recently equipped with real-time customer information displays, providing customers with information about expected wait times.

**Figure 4**: Bus alley between Moore and Lynn Streets


**Figure 5**: Congestion on Moore Street

**Table 1:** Results of 24-hour directional traffic volume counts

| Study location | Number of vehicles during peak hour | | | | | | Number of vehicles per day | | |
|---|---|---|---|---|---|---|---|---|---|
| | 8:00 – 9:00 a.m. | | | 5:00 – 6:00 p.m. | | | | | |
| | EB | WB | Total | EB | WB | Total | EB | WB | Total |
| Wilson Blvd. west of Lynn St. | 1,254 | 833 | 2,087 | 1,200 | 768 | 1,968 | 14,450 | 10,171 | 24,621 |
| | NB | SB | Total | NB | SB | Total | NB | SB | Total |
| Lynn Street north of Wilson Blvd. | 2,192 | NA | 2,192 | 1,735 | NA | 1,735 | 24,830 | NA | 24,830 |
| Fort Myer Dr. south of 19th St. | NA | 1,141 | 1,141 | NA | 1,464 | 1,464 | NA | 16,500 | 16,500 |

Bus circulation is aided by a bus alley connecting Moore and Lynn Streets north of Wilson Boulevard (Figure 4). Use of the alley is prohibited by all vehicles except eastbound buses, which use the route to avoid left turns and congestion on Wilson Boulevard.

There is considerable congestion on Moore Street during peak periods (Figure 5), especially during the evening peak period. The combined activities of buses, pedestrians, taxis, slugs* and customer drop-off and pick-up exchanges contribute to the constrained operating conditions throughout the length of Moore Street between Wilson Boulevard and 19th Street.

***Traffic and Pedestrian Studies***

As part of the study, vehicle and pedestrian travel patterns were documented through several different types of studies. Table 1 summarizes results of 24-hour directional volume counts conducted in the vicinity of the Rosslyn station.

* "Slugs" are people who form impromptu carpools with motorists bound for similar destinations. Slugs form lines in designated locations throughout the metropolitan area and wait for motorists to pick them up. Slugs get a free ride to their destination, and motorists get the benefit of a faster trip on a high-occupancy vehicle (HOV) facility. In Rosslyn, slugs may or may not be Metrorail customers. Some slugs ride Metrorail to the Rosslyn station, exit there, and wait for a ride to their final destination. Other slugs are Rosslyn-area employees who may use Metrorail only when unable to catch a ride as a slug. About 75 slugs enter vehicles during the evening peak hour, with the slug queue reaching a peak of about 20. The designated slug line in Rosslyn was moved in March 2002 from Moore Street to Lee Highway, helping to reduce demands for vehicles on Moore Street.

**Table 2:** Number of peak-hour vehicles making each traffic movement at three station-area intersections; levels of service

| Intersection | Morning peak hour | | | | | | | | | | | | Evening peak hour | | | | | | | | | | | | Level of service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | Northbound | | | Southbound | | | Eastbound | | | Westbound | | | | |
| | L | T | R | L | T | R | L | T | R | L | T | R | L | T | R | L | T | R | L | T | R | L | T | R | AM | PM |
| Wilson Blvd. and Nash St. | 7 | 31 | 25 | 81 | 55 | 176 | 103 | 1,018 | 3 | 54 | 783 | 88 | 11 | 24 | 50 | 104 | 15 | 329 | 66 | 916 | 2 | 18 | 618 | 156 | A | A |
| Wilson Blvd. and Fort Myer Dr. | NA | NA | NA | 151 | 126 | 28 | NA | 970 | 172 | 128 | 931 | NA | NA | NA | NA | 102 | 123 | 86 | NA | 906 | 179 | 179 | 730 | NA | B | B |
| Wilson Blvd. and Moore St. | NA | NA | NA | 53 | NA | 110 | 115 | 1,004 | NA | NA | 950 | 162 | NA | NA | NA | 174 | NA | 178 | 98 | 886 | NA | NA | 724 | 88 | Unsignalized | |
| Wilson Blvd. and Lynn St. | 216 | 1,738 | 140 | NA | NA | NA | 379 | 812 | NA | NA | 659 | 151 | 396 | 1,180 | 165 | NA | NA | NA | 318 | 872 | NA | NA | 543 | 172 | D | C |
| Key Blvd. and Nash St. | 41 | 153 | NA | NA | 196 | 244 | 326 | NA | 131 | NA | NA | NA | 129 | 166 | NA | NA | 280 | 284 | 92 | NA | 69 | NA | NA | NA | Unsignalized | |
| 19th St. and Fort Myer Dr. | NA | NA | NA | 154 | 710 | 232 | NA | 400 | 148 | 120 | 204 | 44 | NA | NA | NA | 53 | 1,038 | 252 | NA | 205 | 100 | 219 | 216 | 2 | B | B |
| 19th St. and Moore St. | 66 | 48 | 60 | 7 | 13 | 6 | 60 | 342 | 52 | 36 | 225 | 55 | 91 | 70 | 77 | 6 | 39 | 53 | 32 | 175 | 86 | 93 | 326 | 38 | A | B |
| 19th St. and Lynn St. | 151 | 1,801 | 31 | NA | NA | NA | 242 | 186 | NA | NA | 272 | 216 | 157 | 1,749 | 24 | NA | NA | NA | 279 | 51 | NA | NA | 239 | 484 | C | B |

Table 2 summarizes results of manual turning movement counts conducted at eight nearby intersections. Detailed capacity analysis was conducted at these intersections following procedures outlined in the *Highway Capacity Manual*. The analysis showed that overall traffic conditions are fair at these intersections during the morning peak period, with severe capacity limitations at the intersection of Wilson Boulevard and Lynn Street, primarily the eastbound left-turn movement. The analysis also shows that afternoon peak-period traffic conditions are also fair, with the same constraint for the eastbound Wilson Boulevard to Lynn Street left turn.

Table 3 summarizes the results of supplementary counts of customers accessing the station.

**Table 3:** Supplementary customer counts near the Rosslyn station

| Pattern | Proceeding toward station entrance | | Proceeding away from station entrance | |
|---|---|---|---|---|
| | Morning peak hour | Evening peak hour | Morning peak hour | Evening peak hour |
| Customers transferring between Metrorail and Metrobus | 125 | 29 | 74 | 104 |
| Customers transferring between Metrorail and taxis (at cab stand) | 2 | 0 | 9 | 19 |
| Customers transferring between Metrorail and shuttle buses | 51 | 116 | 163 | 50 |
| Customers using the skywalk east of the station entrance | 24 | 102 | 168 | 9 |
| Customers using the skywalk west of the station entrance | 131 | 89 | 82 | 67 |
| Customers using the street-to-platform Metrorail elevator | 27 | 83 | 80 | 78 |

***Customer Survey***

In an effort to learn about customers' travel patterns, a customer survey was conducted at the Rosslyn station on September 20, 2001. All customers entering the station that day from 6:30 to 8:30 a.m. and 4:00 to 6:00 p.m. were offered a survey card, which asked several questions about customers' trips to the station. The survey card is shown in Figure 6. The survey posed questions about mode of travel to the station, trip purpose, and origin of the trip to the station.

Customers exiting the station were not surveyed; it was assumed that customers entering the station during the morning peak would likely exit the station during the evening peak, and vice-versa.

Of those customers who received survey cards in the morning, 385 filled out and returned the cards. The response represents a 10.1 percent sample of the total morning peak station volume of 3,820 customers. The response rate results in a confidence interval of 5 percentage points at the 95 percent confidence level. Based on the results of the survey, one can be 95 percent confident that the percentages from the morning survey are within 5 percentage points of their true values. The level of uncertainty generated by the morning-peak survey is sufficiently low for analysis.

Of customers who received survey cards in the evening, 319 filled out and returned the cards. Nearly 7,400 customers enter the station during the evening peak period, about twice as many as in the morning peak. As such, the response rate in the evening peak was only 4.3 percent. The evening peak survey's confidence interval is 6 percentage points at the 95 percent confidence level. Although a confidence interval of 5 percentage points or less would have been ideal, a 6-point interval is sufficient for analysis.

**Figure 6:** Survey card distributed to customers entering the station

**ARLINGTON METRO STATION SURVEY**

*Please take a few moments to help plan for your transit needs by completing this survey and dropping it in any mailbox. No postage is required. Thank you.*

A. How did you get to the Metrorail station where you received this card?

1 ☐ VRE
2 ☐ Walk
3 ☐ Shuttle bus
4 ☐ Bicycle
5 ☐ Tour bus
6 ☐ Taxi
7 ☐ ART bus
8 ☐ Metrobus (Route: _____)
9 ☐ Fairfax Connector (Route: ____)
10 ☐ Dropped off by someone
11 ☐ Drove a car and parked
12 ☐ Rode with someone who parked

B. What is the purpose of your Metrorail trip today?

1 ☐ Traveling to work
2 ☐ Traveling home from work
3 ☐ Job-related business
4 ☐ Shopping or meal
5 ☐ School
6 ☐ Personal trip
7 ☐ Sightseeing or recreation

C. Where did you start your trip to the Metrorail station today?

Address _____
**OR** Street & block no. _____
**OR** Nearest intersection _____
**OR** Building name _____

**Table 4:** Respondents' transportation modes. (Rounding may affect sums.)

| Transportation Mode | Morning Peak | | Evening Peak | |
|---|---|---|---|---|
| | Percent of respondents | Number of customers* | Percent of respondents | Number of customers* |
| Walk | 45% | 1,716 | 68% | 5,052 |
| Shuttle Bus | 3% | 129 | 8% | 626 |
| Tour Bus | 0% | 10 | 0% | 0 |
| Metrobus | 16% | 615 | 11% | 834 |
| Dropped off by someone | 19% | 744 | 4% | 324 |
| Drove and parked | 8% | 298 | 5% | 348 |
| Rode with someone who parked | 1% | 40 | 0% | 23 |
| No response | 7% | 268 | 3% | 185 |
| **Total** | **100%** | **3,819** | **100%** | **7,392** |

* Calculated by applying the survey results to the total number of customers entering the station during morning (5:30 to 9:30 a.m.) and evening (3:00 to 7:00 p.m.) peak periods.

**Table 5:** Respondents' trip purposes. (Rounding may affect sums.)

| Trip Purpose | Morning Peak | | Evening Peak | |
|---|---|---|---|---|
| | Percent of respondents | Number of customers* | Percent of respondents | Number of customers* |
| Traveling to work | 94% | 3,581 | 30% | 2,225 |
| Traveling home from work | 2% | 79 | 61% | 4,495 |
| Job-related business | 1% | 50 | 3% | 232 |
| Shopping or meal | 0% | 0 | 2% | 116 |
| School | 0% | 10 | 1% | 93 |
| Personal trip | 1% | 20 | 3% | 209 |
| Sightseeing or recreation | 0% | 10 | 0% | 23 |
| No response | 2% | 69 | 0% | 0 |
| **Total** | **100%** | **3,819** | **100%** | **7,392** |

* Calculated by applying the survey results to the total number of customers entering the station during morning (5:30 to 9:30 a.m.) and evening (3:00 to 7:00 p.m.) peak periods.

### *Customer Patterns*

The data collection efforts revealed numerous patterns about customers' trips to and from the station.

The first question on the survey asked customers about the mode of transportation they used to arrive at the station. In both the morning and evening periods, survey results indicated that walking is the mode of choice. More customers walk to and from the station than use any other single mode. Metrobuses carry 16 percent of rail customers in the morning and 11 percent in the evening. The only other mode with more than ten percent share was the drop-off mode, accounting for nearly one-fifth of customers in the morning peak but few customers in the evening. Very few respondents, less than one percent in both time periods, indicated that they traveled to the station by bicycle. Detailed results of this question are shown in Table 4.

The second survey question asked about customers' trip purposes. Here, a clear differentiation exists between morning and evening periods. In the morning period, 94 percent of respondents were traveling to work, with other trip purposes garnering negligible responses. In the evening, 60 percent of respondents were traveling home from work, and another 30 percent indicated that they were traveling to work. Few respondents identified other trip purposes. Table 5 shows detailed results of this question.

Finally, the third question on the survey asked customers where they began their trips to the Metrorail station. Customers were given the option to respond with a specific street address, a street and block number, the nearest intersection, or a building name. Although results are available to this question from all respondents, respondents who walk to the station are particularly important for planning pedestrian improvements.

In the morning peak period, when most customers entering the station are area residents enroute to work, 173 respondents (45 percent) indicated that they walk to the station. Figure 7 shows in map form the origins of these pedestrian customers' trips to the station. The trips are summarized by distance and direction in Table 6.

Analyzing the results by distance shows that 80 percent of pedestrians walk less than a half-mile to reach the Metrorail station, and that 90 percent walk less than one mile. From a directional standpoint, the results show that over 90 percent of pedestrians arrive from the south and west of the station, with very few from the north and east.

**Figure 7:** Origins of morning peak pedestrian trips to the Rosslyn station

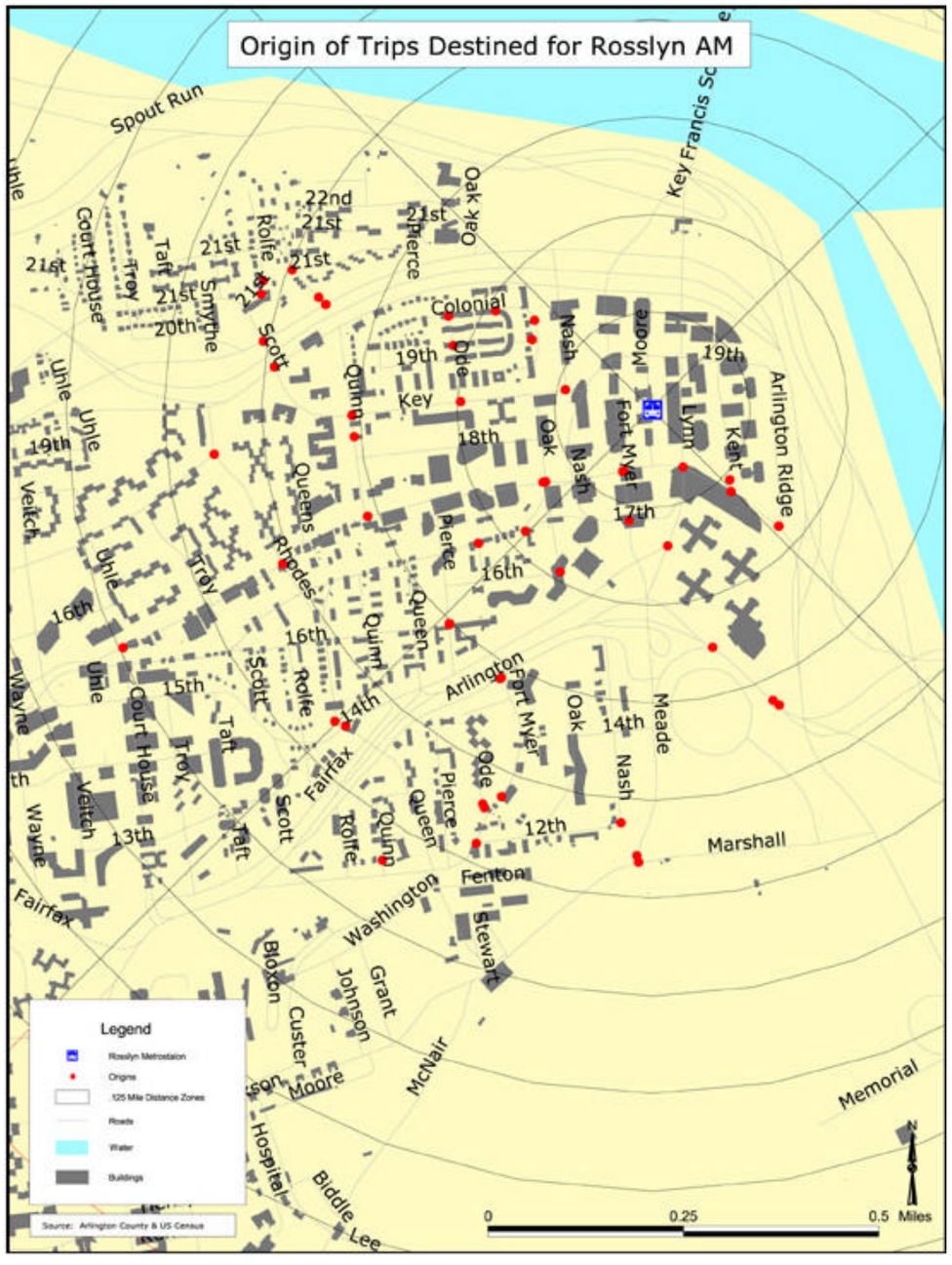



**Table 6: Origins of Morning Peak Walking Trips.** Pedestrians whose morning-peak trips to the station originate from each of the zones shown in Figure 7. (Rounding may affect sums.)

| *Distance from station* | *Percent of respondents* | | | | | *Number of customers** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *North* | *South* | *East* | *West* | *Total* | *North* | *South* | *East* | *West* | *Total* |
| 0 to 1/8 mile | 0% | 2% | 0% | 1% | **3%** | 0 | 38 | 0 | 13 | **51** |
| 1/8 to 1/4 mile | 0% | 16% | 3% | 6% | **24%** | 0 | 267 | 51 | 102 | **419** |
| 1/4 to 3/8 mile | 0% | 13% | 0% | 11% | **23%** | 0 | 216 | 0 | 191 | **407** |
| 3/8 to 1/2 mile | 0% | 22% | 0% | 8% | **30%** | 0 | 381 | 0 | 140 | **521** |
| 1/2 to 5/8 mile | 0% | 7% | 0% | 1% | **7%** | 0 | 114 | 0 | 13 | **127** |
| 5/8 to 3/4 mile | 0% | 1% | 0% | 0% | **1%** | 0 | 13 | 0 | 0 | **13** |
| 3/4 to 7/8 mile | 0% | 0% | 0% | 0% | **0%** | 0 | 0 | 0 | 0 | **0** |
| 7/8 to 1 mile | 0% | 0% | 0% | 0% | **0%** | 0 | 0 | 0 | 0 | **0** |
| 1 to 1-1/8 miles | 1% | 0% | 0% | 0% | **1%** | 13 | 0 | 0 | 0 | **13** |
| Over 1-1/8 miles | 2% | 3% | 1% | 3% | **10%** | 38 | 51 | 25 | 51 | **165** |
| **Total** | **3%** | **63%** | **4%** | **30%** | **100%** | **51** | **1,080** | **76** | **508** | **1,716** |

* Calculated by applying the survey results to the number of customers who walk to the station during the morning peak period (5:30 to 9:30 a.m.), as determined in Table 4.

In the evening peak period, when most customers entering the station are area employees enroute home from work, 218 respondents (68 percent) indicated that they walk to the station. Figure 8 shows in map form the origins of evening peak pedestrian customer trips to the station, and Table 7 reports the results in tabular form. In the evening peak period, customers approached the station nearly uniformly from the south, east, and west, but few customers approached from the north. From a distance standpoint, over two-thirds of respondents walked less than one-fourth mile to reach the station.

Data from non-pedestrian customers was analyzed for both morning and evening peak periods, but no significant pattern of trip origins was found.

**Figure 8:** Origins of evening peak pedestrian trips to the Rosslyn station


**Table 7: Origins of Evening Peak Walking Trips.** Pedestrians whose evening-peak trips to the station originate from each of the zones shown in Figure 8. (Rounding may affect sums.)

| *Distance from station* | *Percent of respondents* | | | | | *Number of customers** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *North* | *South* | *East* | *West* | *Total* | *North* | *South* | *East* | *West* | *Total* |
| 0 to 1/8 mile | 5% | 3% | 7% | 1% | **15%** | 231 | 144 | 346 | 29 | **751** |
| 1/8 to 1/4 mile | 1% | 21% | 17% | 15% | **53%** | 29 | 1,039 | 847 | 751 | **2,656** |
| 1/4 to 3/8 mile | 0% | 4% | 0% | 8% | **12%** | 0 | 202 | 0 | 404 | **606** |
| 3/8 to 1/2 mile | 0% | 2% | 0% | 0% | **2%** | 0 | 115 | 0 | 0 | **115** |
| 1/2 to 5/8 mile | 0% | 1% | 0% | 1% | **2%** | 0 | 58 | 0 | 29 | **87** |
| 5/8 to 3/4 mile | 0% | 0% | 0% | 0% | **0%** | 0 | 0 | 0 | 0 | **0** |
| 3/4 to 7/8 mile | 0% | 0% | 0% | 0% | **0%** | 0 | 0 | 0 | 0 | **0** |
| 7/8 to 1 mile | 1% | 0% | 0% | 1% | **1%** | 29 | 0 | 0 | 29 | **58** |
| 1 to 1-1/8 miles | 1% | 0% | 1% | 0% | **2%** | 29 | 0 | 58 | 0 | **87** |
| Over 1-1/8 miles | 2% | 3% | 5% | 3% | **14%** | 87 | 173 | 260 | 173 | **693** |
| **Total** | **8%** | **34%** | **30%** | **28%** | **100%** | **404** | **1,732** | **1,501** | **1,415** | **5,052** |

* Calculated by applying the survey results to the number of customers who walk to the station during the morning peak period (5:30 to 9:30 a.m.), as determined in Table 4.

## Development Forecast

### *Development Sites*

The Rosslyn neighborhood features a mix of uses in a community of over 6,000 residential units, 2,000 hotel rooms, 700,000 square feet of retail space, and more than 9 million square feet of office space. With a state-of-the-art communications infrastructure and one of the region's largest concentrations of high-quality, high-density office space, Rosslyn offers tremendous opportunities for business growth. Growth in Metrorail ridership by 2020 will depend largely on development changes in the immediate vicinity of the station.

The following procedures and general assumptions were pursued in projecting net development changes in the next two decades:

- Sites with development built prior to 1970 were considered prime redevelopment candidates and, in many cases, demolition and rebuilding these sites was assumed to occur.
- The focus of the redevelopment was assumed to be the C-O Rosslyn zoning district.
- Properties in the C-O Rosslyn zoning area were assumed to develop/redevelop at 10 FAR.
- New development on Office/Residential development sites was assumed to be equally split between those two uses.
- Ground floor retail was assumed to occupy 7 percent of all new developments.

*Development in the Metro Corridors 2000,* a report published by the Arlington County Department of Community Planning, Housing and Development, was utilized to determine the existing development on the parcels near the Rosslyn station. Table 9 summarizes the specific development and redevelopment assumptions for parcels that are likely for change in net development to occur prior to 2020. Future Metrorail trips were projected according to these development assumptions.

### *Metrorail Customer Forecast*

Preliminary indications from the Core Capacity Study suggest that Metrorail volume at Rosslyn will reach about 22,000 entries per weekday by the year 2020, a 44 percent increase over 2001 volumes. Existing and future customer volume forecasts are shown in Table 8.

Two sources of information were used to forecast the numbers of Metrorail customers who would walk from future developments. One was the results of the survey in the current study; the other was *Development Related Ridership Survey II*, a 1989 study that estimated transit mode share based on a larger sample of Metrorail customers.

The survey data collected for this report were used to relate present customers to existing buildings. For each 1/8-mile distance from the station, a ratio of peak-period customers per

**Table 8:** Customer entries, 2001 and 2020

| | *Entering Customers* | |
|---|---|---|
| | ***2001*** | ***2020*** |
| AM Peak period (5:30 – 9:30 a.m.) | 4,200 | 5,900 |
| PM Peak period (3:00 – 7:00 p.m.) | 6,500 | 9,300 |
| Daily | 15,300 | 22,000 |

Sources: Core Capacity Study, WMATA faregate data

1,000 square feet of building size was developed. The ratios were generally similar to those produced by the 1989 survey. For each 1/8-mile distance, a ratio to be used in the study was determined by drawing a best-fitting line between the means of the ratios calculated from the two surveys.

The final ratio would produce an estimate of additional customers from new developments, given assumptions about the sizes of the developments drawn from *Development in the Metro Corridors 2000.*

Direction from the station was also considered. At the Rosslyn station, the significant grade west of the station is a large impediment to pedestrian use of Metrorail; as such, fewer customers are likely to walk to the Metrorail station than the ratio suggests. Directional factors were likewise assigned for each of the four cardinal directions.

The methodology produced a single value for pedestrian customers approaching the station from each new development during the four-hour morning peak period and the four-hour evening peak period combined. These values were allocated to the morning versus evening peak periods using ratios from ITE's *Trip Generation*, 6th edition. Specifically, 85 percent of trips generated by office developments were assumed to enter the station during the evening peak period, while only 15 percent of these trips were assumed to enter during the morning peak period. Likewise, 73 percent of residential trips were assumed to enter the station during the morning peak period, and the remaining 27 percent were assumed to enter during the evening peak period. Retail and hotel land uses were assumed to be equally split between morning and evening peak periods.

### *Metrobus Customer Forecast*

WMATA does not have specific projections for future bus ridership at the Rosslyn Station. However, the Core Capacity Study forecasts a three percent annual growth rate in Metrobus ridership. To meet demand for both current and new Metrobus routes in the immediate future, WMATA recommends adding three new bus bays at the Rosslyn station.

# ROSSLYN METRORAIL STATION ACCESS STUDY

**Table 9:** 2020 development forecast for Rosslyn station area

| *Project Name* | *Location* | *New Development Type* | *Zone** | *Net Change in Development* | | | | *Net Change in Pedestrian Entries* | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Office sq. feet* | *Retail sq. feet* | *Res. units* | *Hotel rooms* | *Both peaks* | *AM peak* | *PM peak* |
| Rosslyn Metro Center | 1800 N. Moore St. | Office/Retail | E1 | 255,000 | 12,000 | | | 207 | 36 | 171 |
| 1801 N. Lynn St. | 1801 N. Lynn St. | Office/Retail | E1 | 347,000 | 7,000 | | | 271 | 43 | 228 |
| Rosslyn Plaza | 1601-1701 N. Kent St. | Office/Retail/Residential | E1/E2 | 608,000 | 84,000 | 269 | | 705 | 223 | 481 |
| Central Place | 1801 N. Moore St. | Office/Retail/Hotel | E1 | 73,000 | 1,000 | | 150 | 201 | 81 | 120 |
| Waterview | 1111 N. 19th St. | Office/Retail/Residential/Hotel | N1 | 411,000 | 3,000 | 65 | 220 | 538 | 172 | 366 |
| Colonial Heights | 1555 N. Colonial Ter. | Residential | N1 | | | 14 | | 7 | 5 | 2 |
| Rosslyn Bldgs./RCA Bldg. | 1901-11 N. Ft. Myer Dr. | Office/Retail | N1 | 553,000 | 47,000 | | | 453 | 85 | 368 |
| 1881 Nash | 1881 N. Nash St. | Residential/Retail | N1 | | 4,000 | 173 | -178 | -66 | -12 | -54 |
| CACI Bldg. | 1815 N. Ft. Myer Dr. | Office/Retail | N1 | 340,000 | 22,000 | | | 271 | 49 | 222 |
| Westpark Hotel | 1900 N. Ft. Myer Dr. | Residential | N2 | | | 282 | -300 | -96 | -17 | -79 |
| Key Bldg./Berkeley Bldg. | 1200 N. Wilson Blvd. | Office/Retail | S1 | 556,000 | 57,000 | | | 446 | 87 | 359 |
| River Place | 1011 N. Arlington Blvd. | Office/Residential | S2/S3 | 930,000 | -69,000 | -633 | | 17 | -303 | 320 |
| Monument Place | 1400 N. Meade St. | Residential | S3 | | | 17 | | 7 | 5 | 2 |
| Bromptons, Potomac Hgts. | 1320 N. Oak St. | Residential | S3 | | | 3 | | 1 | 1 | 0 |
| Bromptons, Monument Pl. | N. Nash St. | Residential | S3 | | | 15 | | 6 | 4 | 2 |
| North Meade St. | 1201 N. Nash St. | Residential | S3 | | | 40 | | 16 | 12 | 4 |
| Art Assoc. Bldg. | 1501 N. Wilson Blvd. | Residential | W1 | -108,000 | -18,000 | 140 | | -19 | 27 | -45 |
| Oak Hills | 1401 N. Wilson Blvd. | Office/Retail | W1 | 320,000 | 34,000 | | | 218 | 43 | 175 |
| Nash St. Office Bldg. | 1400 N. Key Blvd. | Hotel | W1 | -146,000 | -12,000 | | 350 | 162 | 111 | 51 |
| Christiana House | 1509 N. Key Blvd. | Residential | W1 | | | 4 | | 2 | 1 | 0 |
| Twin Oak Apartments | 1800 N. Oak St. | Residential | W1 | | 4,000 | 317 | | 140 | 101 | 39 |
| Undesignated (Site G) | | Residential | W2 | | | 236 | | 92 | 67 | 25 |
| Colonial Heights | 1597 N. Colonial Ter. | Residential | W2 | | | 3 | | 1 | 1 | 0 |
| 1600 Bldg. | 1600 N. Wilson Blvd. | Residential | W3 | -175,000 | -8,000 | 263 | | 22 | 54 | -32 |
| **Total** | | | | **3,963,000** | **170,000** | **1,208** | **242** | **3,745** | **1,004** | **2,741** |

Sources: *Development in the Metro Corridors 2000*, discussions with Arlington County Public Works and Planning staff

* Zone letter indicates direction from station; zone number indicates distance from station: value 1 indicates distance from 0 to 1/8 mile, value 2 indicates distance from 1/8 to 1/4 mile, etc.

# ROSSLYN METRORAIL STATION ACCESS STUDY

The final columns of Table 9 indicate the number of new pedestrian Metrorail customers forecast to enter the Rosslyn station during morning and evening peak periods for each new development. Table 10 aggregates the values from these two columns by 1/8-mile distance away from the station and by direction from the station.

Table 11 shows the total number of pedestrian customer entries expected in the year 2020. These values were computed by adding current pedestrian flows (Tables 6 and 7) to pedestrian flows generated by new development (Table 10).

The forecast calls for an increase of about 1,000 pedestrian trips entering the station during the morning peak period, about 59 percent more pedestrian trips than in 2001. In the evening peak period, about 2,700 pedestrian trips entering the station will be generated by new development, an increase of about 54 percent over existing pedestrian trips.

About 95 percent of new pedestrian trips are attributable to new development within ¼ mile of the station. New development farther than 3/8 mile from the station generally falls outside the limits of the Rosslyn station area; these developments would be unlikely to generate significant additional pedestrian trips at the Rosslyn station.

New development is distributed in all four compass directions from the station, but new development is concentrated more heavily north and east of the station. Most existing pedestrian customers come from the south and west, so new development will result in additional pedestrian travel from areas where little currently exists. The study's recommendations account for this propensity.

**Table 10:** Net change in pedestrian station entries attributable to 2020 development

| *Distance from station* | *Morning peak-period entries* | | | | | *Evening peak-period entries* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *North* | *South* | *East* | *West* | *Total* | *North* | *South* | *East* | *West* | *Total* |
| 0 to 1/8 mile | 300 | 87 | 306 | 283 | **976** | 904 | 359 | 838 | 220 | **2,322** |
| 1/8 to 1/4 mile | -17 | -303 | 79 | 68 | **-173** | -79 | 320 | 161 | 25 | **427** |
| 1/4 to 3/8 mile | 0 | 147 | 0 | 54 | **200** | 0 | 24 | 0 | -32 | **-8** |
| Over 3/8 mile | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** |
| **Total** | **283** | **-70** | **386** | **405** | **1,004** | **825** | **704** | **999** | **213** | **2,741** |

Source: Aggregated data from Table 9.

**Table 11:** Predicted 2020 pedestrian customer station entries

| *Distance from station* | *Morning peak-period entries* | | | | | *Evening peak-period entries* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *North* | *South* | *East* | *West* | *Total* | *North* | *South* | *East* | *West* | *Total* |
| 0 to 1/8 mile | 300 | 125 | 306 | 296 | 1,027 | 1,135 | 503 | 1,184 | 249 | **3,073** |
| 1/8 to 1/4 mile | 0 | 0 | 130 | 170 | 246 | 0 | 1,359 | 1,008 | 776 | **3,083** |
| 1/4 to 3/8 mile | 0 | 363 | 0 | 245 | 607 | 0 | 226 | 0 | 372 | **598** |
| 3/8 to 1/2 mile | 0 | 381 | 0 | 140 | 521 | 0 | 115 | 0 | 0 | **115** |
| 1/2 to 5/8 mile | 0 | 114 | 0 | 13 | 127 | 0 | 58 | 0 | 29 | **87** |
| 5/8 to 3/4 mile | 0 | 13 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | **0** |
| 3/4 to 7/8 mile | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 7/8 to 1 mile | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 29 | **58** |
| 1 to 1-1/8 miles | 13 | 0 | 0 | 0 | 13 | 29 | 0 | 58 | 0 | **87** |
| Over 1-1/8 miles | 38 | 51 | 25 | 51 | 165 | 87 | 173 | 260 | 173 | **693** |
| **Total** | **334** | **1,010** | **462** | **913** | **2,720** | **1,229** | **2,436** | **2,500** | **1,628** | **7,793** |
| **Increase from 2001** | **555%** | **0%** | **508%** | **78%** | **59%** | **204%** | **41%** | **67%** | **15%** | **54%** |

Source: Sum of existing trips (Tables 6 and 7) and new trips (Table 10).
Note: Negative numbers were set to zero without adjusting marginal sums.

# ROSSLYN METRORAIL STATION ACCESS STUDY

## Planned Station-Area Improvements

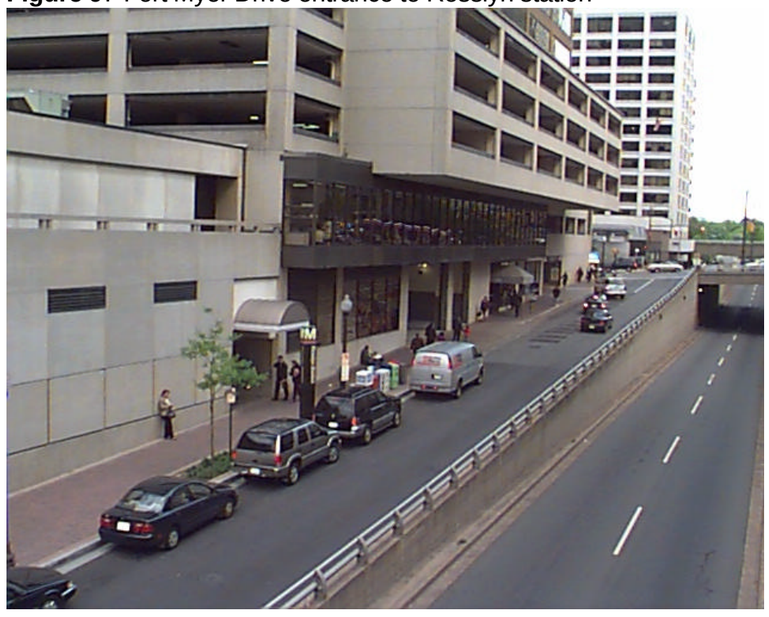
Some improvements that would enhance station access are already planned to be built by other parties.

Plans for the renovation and expansion of the Rosslyn Metro Center Building, which is located above the present station entrance, include improvements to the station lobby and faregate area. The improvements include the modification of the building structure over the lobby to make it more open and the installation of windows in the wall along Fort Myer Drive (Figure 9) to increase natural light. A second entrance and stairway into the lobby from Fort Myer Drive is to be added at the northwest corner of the lobby; the existing entrances from Fort Myer Drive and Moore Street would remain and be protected by canopies. Within the lobby, the escalator to the skywalk level is to be reconstructed so that the street-level end faces Moore Street. Arlington County's approval of these plans for the Rosslyn Metro Center Building is effective through January 2005. The developer has not yet begun construction.

The block across Moore Street is also planned for new construction, although the plans are less well defined. That construction would affect the area surrounding the top of the existing elevator into the station from street level.

As part of an ongoing project, Arlington County is installing traffic enforcement and parking identifier signs in the Rosslyn Station block area.

**Figure 9**: Fort Myer Drive entrance to Rosslyn station



## Community Involvement

A meeting was held with residents and business owners in the area surrounding the Metrorail station to allow the community to be involved in the planning process. The meeting was held on February 20, 2002, with the goal of soliciting suggestions for station-area improvements from the community.

## Recommended Operational Improvements

The following operational changes are recommended to improve motor vehicle circulation near the station:

***Reversal of Traffic Direction on Fort Myer Drive East Ramp***

Fort Myer Drive is a one-way, southbound arterial street that runs from Key Bridge and the intersection with Lee Highway to the southern portion of Rosslyn. The center lanes of Fort Myer Drive pass under Wilson Boulevard at a grade-separated interchange. South of 19th Street, the left and right lanes of Fort Myer Drive ramp up to intersect Wilson Boulevard at grade. The east ramp is restricted to left turns and through movements (to return down the ramp to Fort Myer Drive), while the west ramp is limited to right turns and through movements. Figure 10 displays the current configuration.

A potentially significant access improvement, presented in Figure 11, would be to reverse the direction of flow on the east ramp from southbound to northbound between Wilson Boulevard and 19th Street. Such a modification would facilitate several issues related to station access:

- Traffic circulation on the block bound by Moore Street, Wilson Boulevard, Fort Myer ramp and 19th Street would have a continuously clockwise flow. The current counterclockwise direction of flow is problematic since it requires a series of often-difficult left turns.
- The customer drop-off and pick-up exchanges on the Fort Myer ramp would be made with vehicle passengers opening their car doors on the curbside, the ideal operation. Currently, vehicle passengers must open their doors on the travel lane side of the ramp.
- An additional left turn opportunity would be created at the east Fort Myer ramp for eastbound Wilson Boulevard to points north, thus avoiding the left turn from Wilson Boulevard to Lynn Street northbound, which is presently over capacity during peak traffic periods.

Other related measures required in conjunction with the reversal of the Fort Myer Ramp include the following:

- Modification of the eastbound Wilson Boulevard approach to Fort Myer Drive to include a left-turn arrow phase to operate concurrently with the existing westbound left-turn arrow phase. The signal timings for the intersection would also require adjustments.
- The lane use would change from a through lane to a left-only lane in the eastbound direction on Wilson Boulevard.

**Figure 10:** Existing Fort Myer Drive traffic circulation

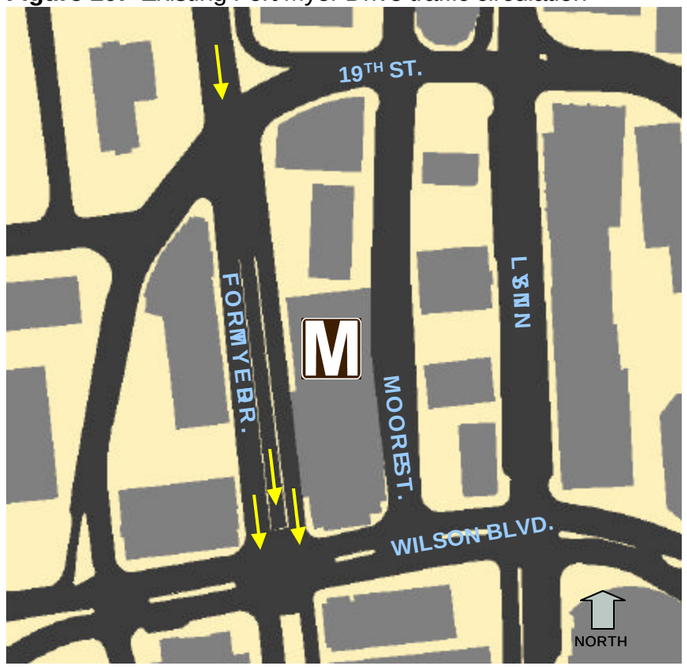
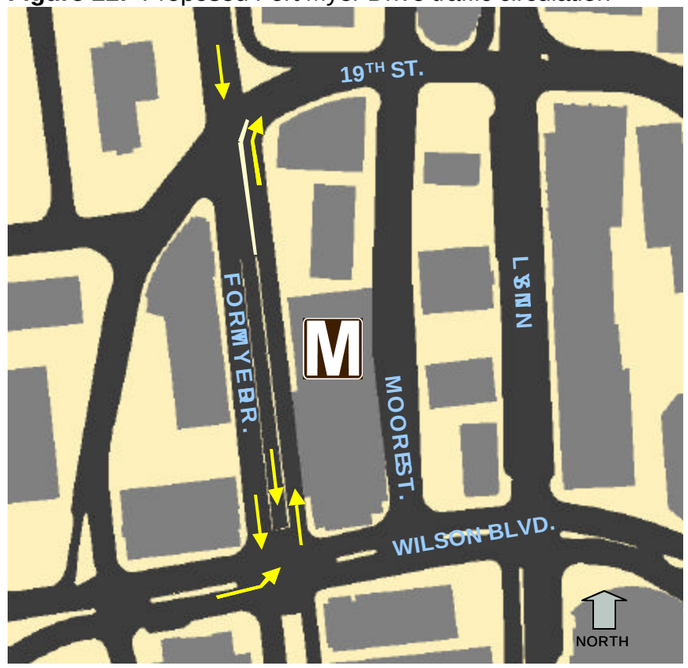



**Figure 11:** Proposed Fort Myer Drive traffic circulation




- Construction of a concrete median to divide the directions of flow on Fort Myer Drive. The median would extend the length of the counter-flow ramp and channelize motorists around the corner onto eastbound 19th Street.
- Retiming of signals in the vicinity to accommodate modified traffic patterns.

A cost estimate for the changes is shown in Table 12.

**Table 12: Order of magnitude cost estimate for Fort Myer Drive ramp reversal**

| *Element* | *Approximate Cost (FY 2002 dollars)* |
|---|---|
| Left-turn lane, traffic signal modifications, new curbs | $500,000 |
| Planning, design, construction management, agency costs, and contingencies | $500,000 |
| **Total Cost** | **$1,000,000** |

# ROSSLYN METRORAIL STATION ACCESS STUDY

***Moore Street Curbside Utilization***

Moore Street is the location of the primary Rosslyn station entrance and serves a variety of transportation functions including pedestrian, bus, taxi, shuttle, loading and, unofficially, customer drop-off and pick-up activity. The block of Moore Street between Wilson Boulevard and 19th Street often becomes congested in the morning and evening peak periods due to these competing vehicular activities, as well as to pedestrians using the mid-block crosswalk in front of the station entrance.

On March 17, 2002, several changes were instituted to facilitate transportation operations on Moore Street. Figure 12 illustrates the newly instituted curbside strategy, which includes the following changes:

- The Georgetown University Shuttle (GUTS) stops on the west side of Moore Street, north of 19th Street.
- The Georgetown Connector stops on the west side of Moore Street at the first stop south of 19th Street.
- The slug line was moved several blocks to the north adjacent to Lee Highway.
- Layovers of ten minutes or less continue to be taken at the designated bus bays for Moore Street routes.
- Layovers longer than ten minutes, including meal layovers, discharge customers at a designated bus bay on Moore Street, continue on Moore Street, turn left on the alley to Lynn Street, turn left on Lynn Street, turn left on 19th Street, turn right on Moore Street, turn right on the eastbound service roadway of Lee Highway, turn right on southbound service roadway of Lynn Street to the layover area on the left curb.
- Routes 5A and 5B (formerly served by Bay D) and new route B11 stop at the second stop south of 19th Street. Bay D will serve only Route 38B.

**Figure 12:** Existing station area curbside use

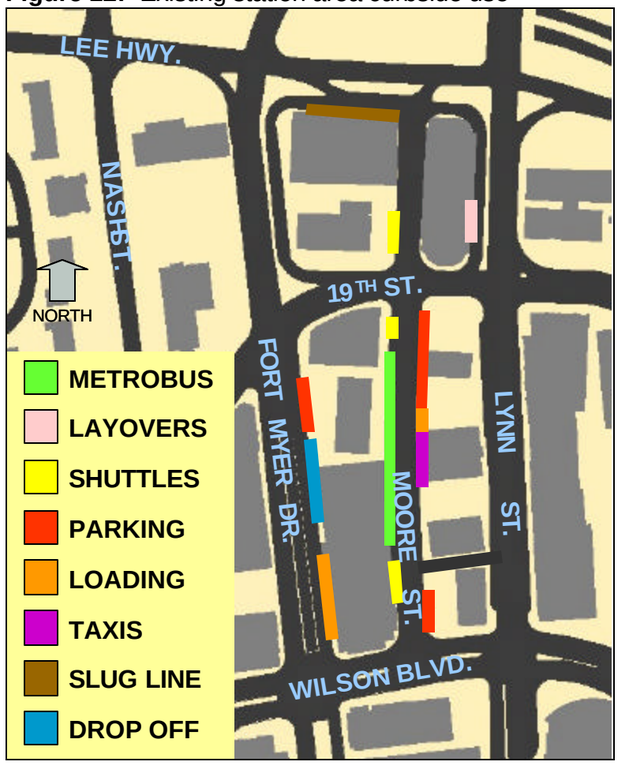
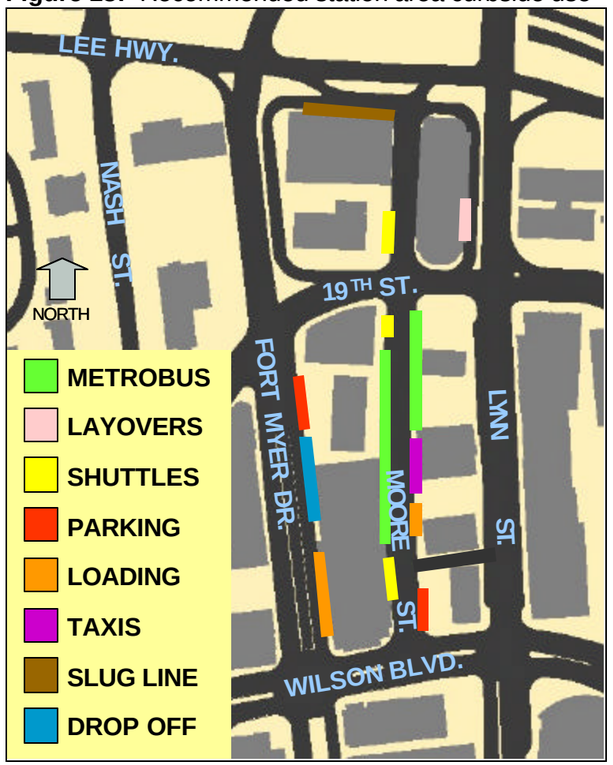



**Figure 13:** Recommended station area curbside use




The following improvements are recommended in addition to these operational changes:

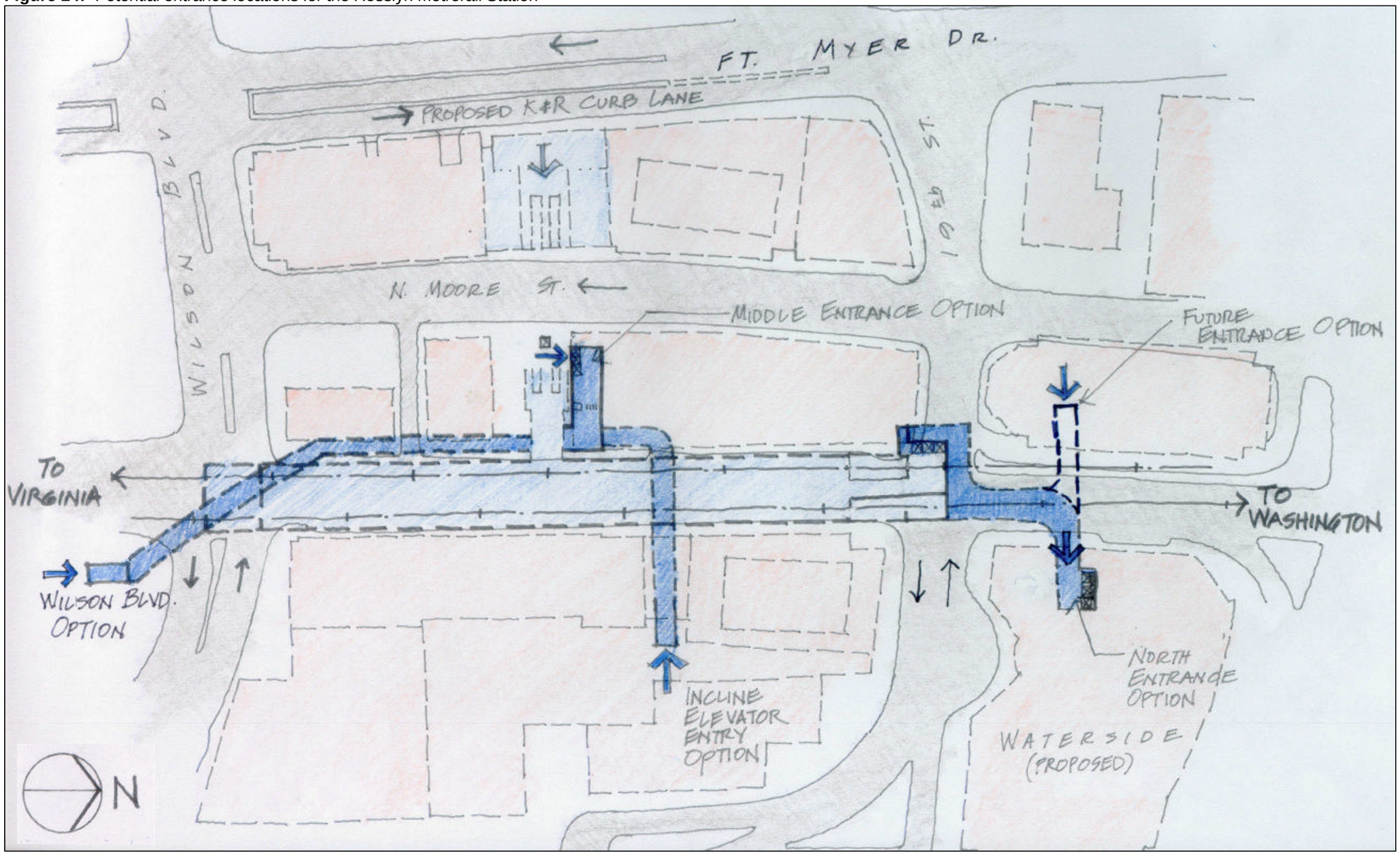
- Remove the parking meters along the east side of Moore Street south of 19th Street.
- Shift the loading area to just north of the crosswalk.
- Add three bus bays at the curbside area on Moore Street formerly occupied by on-street parking and loading.

The recommended curbside use is illustrated in Figure 13.

## Potential Station Entrance Locations

Figure 14 depicts potential new station entrance locations designed to improve access. Each suggested improvement is discussed in further detail below.

**Figure 14:** Potential entrance locations for the Rosslyn Metrorail Station



***North Entrance Option***

A new development, Waterview, is planned to be built on the block north of 19th Street and east of Lynn Street. Arlington County's approval of the building included the requirement for access to a new Metrorail station entrance. The North Entrance option configuration includes new pedestrian access at the northeast corner of Lynn and 19th Streets. Three elevators would connect the Waterview street level with an underground concourse to a mezzanine built beneath Lynn Street and 19th Street. The new mezzanine would be at the same elevation as the P1 level of the Waterview development. The new mezzanine would connect to the upper platform level with a bank of three elevators. A new emergency egress stairway from the upper platform level to the street could be converted to an alternative station entrance with a straight stair run from the free area of the mezzanine to the street. A new faregate array would be installed in the new mezzanine between the platform elevators and the street elevators. The existing upper platform would be extended to the north, and vertical circulation between the upper and lower platforms would be expanded with one new elevator, one new escalator, and one new stairway. Figures 15 and 16 present diagrams of this option.

The North Entrance option would promote pedestrian safety by diverting pedestrians into the station where they would not have to cross the intersection of Lynn and 19th Streets. Vehicular traffic may also improve because of the reduction in Metrorail-bound pedestrians crossing Lynn and 19th Streets.

The North Entrance option would serve the projected growth in pedestrian traffic particularly well. About two-thirds of pedestrian trips generated by future development will have origins north and east of the station, which is precisely the location of the North Entrance option. Customers approaching the station from north of 19th Street and east of Lynn Street would reduce their walking trip lengths by about 1/8 mile. The trip-length reduction is significant enough that it would encourage additional pedestrian Metrorail customers. Fewer than 50 customers would be attracted during the morning peak period, but about 350 additional customers could be attracted during the evening peak period. On a daily basis, the North Entrance would be likely to attract about 600 additional customers.

**Table 13:** Forecast of station entries in 2020 under North Entrance scenario

| | ***No new entrance constructed*** | ***North Entrance constructed*** | |
|---|---|---|---|
| | ***Customers using existing entrance*** | ***Customers using existing entrance*** | ***Customers using North Entrance*** |
| AM Peak Period | 5,900 | 3,400 | 2,600 |
| PM Peak Period | 9,300 | 5,100 | 4,600 |
| Daily | 22,000 | 12,200 | 10,400 |

**Figure 15:** Potential north entrance, mezzanine level

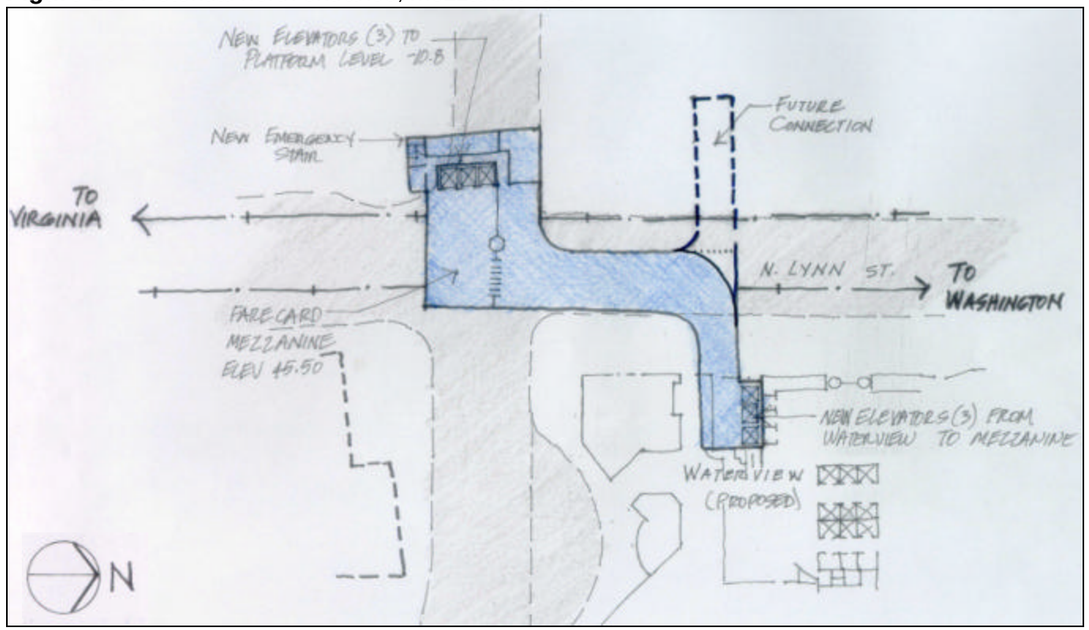



**Figure 16:** Potential north entrance, upper platform level

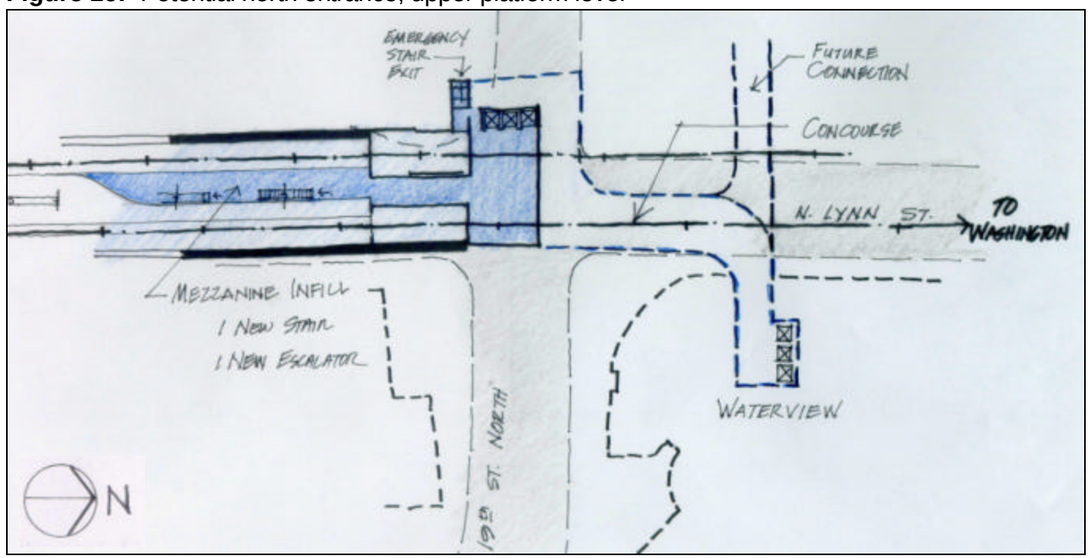


Table 13 presents customer forecasts for the North Entrance if constructed. Pedestrian customers whose trips originate north of the station would likely use the new entrance, and customers to the south would likely use the existing entrance. For analysis purposes, one-third of pedestrian customers to the west and two-thirds of pedestrian customers to the east were assumed to shift to the new entrance Half of non-pedestrian customers were assumed to shift to the new entrance.

Based on the forecasted customer volume, elevator capacity requirements were calculated. In order to serve peak 30-minute customer demand, three street-to-mezzanine elevators and three mezzanine-to-platform elevators would be required.

Table 13 forecasts 10,400 weekday customer entries for the North Entrance if constructed. The entrance would serve a similar number of customer exits, for a total annual customer volume of approximately 4 million.

A cost estimate for the North Entrance option is shown in Table 14.

The North Entrance's new mezzanine would require operating and maintenance costs ranging from $250,000 to $400,000 per year. These costs include new Station Manager staff.

A future connection is a potential additional feature of the North Entrance option. An underground tunnel originating at an undetermined point in the west would connect to the new mezzanine underneath Lynn Street and thus provide direct access to the new faregates and elevators that lead to the upper platform. If implemented, the future connection would further enhance the desirability of the North Entrance option by offering access to the station from additional locations north of the existing station entrance.

**Table 14:** Order of magnitude cost estimate for North Entrance

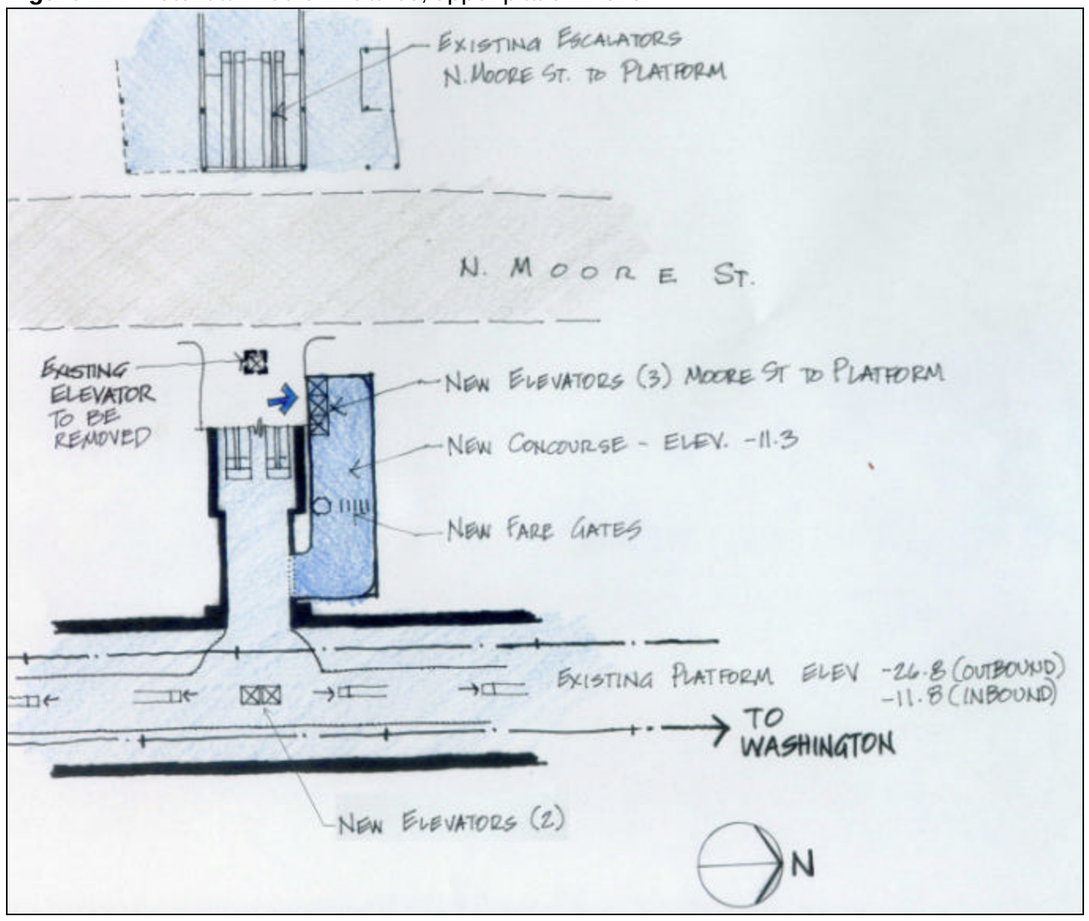
| *Element* | *Approximate Cost (FY 2002 dollars)* |
|---|---|
| Entry, passageway and platform extension | $9,000,000 |
| Platform extension, internal capacity enhancement | $5,000,000 |
| Planning, design, construction management, agency costs, and contingencies* | $14,000,000 |
| **Total Cost** | **$28,000,000** |

* Excludes right-of-way costs

***Middle Entrance Option***

The Middle Entrance option includes a new bank of three elevators on the east side of Moore Street, slightly north and east of the existing elevator. These elevators would connect the street level with the upper platform level. A new faregate array would be provided outside of the elevators at the platform level. Figure 17 gives an illustration of the Middle Entrance option.

**Figure 17:** Potential Middle Entrance, upper platform level



The middle entrance provides additional capacity near the location of the existing station escalators, but because it is so near the existing entrance, it would reduce customers' walking distances by no further than 150 feet. It would thus not be expected to attract significant numbers of new customers to Metrorail. However, some Metrorail customers have reported that Rosslyn's long escalators are uncomfortable to ride. A reliable and high-speed elevator option would improve station access for these individuals.

Table 15 presents customer forecasts for the Middle Entrance if constructed. Pedestrian customers whose trips originate east of the station would likely use the new entrance, and customers to the west would likely use the existing entrance. For analysis purposes, half of pedestrian customers to the north and south of the station were assumed to shift to the new entrance In addition, half of non-pedestrian customers were assumed to shift to the new entrance.

Based on the forecasted customer volume, elevator capacity requirements were calculated. In order to serve peak 30-minute customer demand, three elevators would be required at the Middle Entrance.

Table 15 forecasts 11,200 weekday customer entries for the Middle Entrance if constructed. The entrance would serve a similar number of customer exits, for a total annual customer volume of approximately 4 million.

A primary advantage of the Middle Entrance option is that it would greatly improve the existing street elevator service. Wait times at the single existing street elevator are beyond comfortable limits. In addition, the Middle Entrance option would provide redundant street elevator service, virtually eliminating service interruptions caused when the existing street elevator is out of service.

If the Moore Street curbside use is revised as recommended earlier, the Middle Entrance option offers excellent connectivity to relocated Metrobus stops. By using the new elevators, Metrobus customers who use bus stops on the east side of Moore Street could transfer between Metrobus and Metrorail without having to cross vehicular traffic at the mid-block crosswalk on Moore Street. Furthermore, pedestrians could access services on the east side of Moore Street, such as the taxi stand, without crossing Moore Street, reducing pedestrian-vehicle conflicts.

Inside the station, the Middle Entrance option features vertical circulation improvements similar to the North Entrance option: one new platform-to-platform elevator, one new escalator, and one new stairway.

The Middle Entrance would require operating and maintenance costs at about the same level as the North Entrance option if a kiosk located in that area is determined to be necessary.

A cost estimate for the Middle Entrance option is shown in Table 16.

**Table 15:** Forecast of station entries in 2020 under Middle Entrance scenario

| | ***No new entrance constructed*** | ***Middle Entrance constructed*** | |
|---|---|---|---|
| | ***Customers using existing entrance*** | ***Customers using existing entrance*** | ***Customers using Middle Entrance*** |
| AM Peak Period | 5,900 | 3,200 | 2,700 |
| PM Peak Period | 9,300 | 4,200 | 5,100 |
| Daily | 22,000 | 10,800 | 11,200 |

**Table 16:** Order of magnitude cost estimate for Middle Entrance

| ***Element*** | ***Approximate Cost (FY 2002 dollars)*** |
|---|---|
| Street elevators, passageway, faregates | $4,000,000 |
| Internal station improvements: elevator, escalator, stairway | $5,000,000 |
| Planning, design, construction management, agency costs, and contingencies* | $9,000,000 |
| **Total Cost** | **$18,000,000** |

* Excludes right-of-way costs

***Inclined Elevator Entry Option***

The Inclined Elevator Entry Option was conceived in an earlier WMATA/Arlington County study that featured an inclined elevatorway with an entrance location east of the existing station entrance on the east side of Lynn Street. The concept for using inclined elevators was to provide customers a direct route to the station's upper platform level from a Lynn Street entrance, traveling over the existing train room. A new faregate array, similar to the Middle Entrance Option, would control access to and from the upper platform level.

The Inclined Elevator option would benefit customers approaching the station from the east, reducing walking trips by as much as 400 feet. Such a reduction in walking distance would be likely to attract additional pedestrian customers to Metrorail: less than 50 customers during the morning peak period and about 250 customers during the evening peak period. Over a typical weekday, about 450 new customers would be attracted.

Table 17 presents customer forecasts for the Inclined Elevator Entry if constructed. Like the Middle Entrance, pedestrian customers whose trips originate east of the station would likely use the new entrance, and customers to the west would likely use the existing entrance. For analysis purposes, half of pedestrian customers to the north and south of the station were assumed to shift to the new entrance Because the Inclined Elevator Entry is not conveniently located near the roadway network, two-thirds of non-pedestrian customers are assumed to continue to use the existing entrance.

Table 17 forecasts 10,100 weekday customer entries for the Middle Entrance if constructed. The entrance would serve a similar number of customer exits, for a total annual customer volume of approximately 4 million.

Although the Inclined Elevator Entry Option presents the most direct route for customers to access the upper station platform from the east, this option has several disadvantages:

- In order to serve the number of customers using the entrance during the peak period, approximately 17 inclined elevators would have to be installed due to their slow rate of travel.
- Elevator manufacturers report that inclined elevators experience frequent breakdowns and have higher maintenance requirements than standard elevator systems.

Inclined elevators are produced for specialized applications and are not designed for the heavy use associated with a transit station entrance. The only known transit uses of inclined elevators in the U.S. are at the Huntington Station in the WMATA system and at the City Place LRT Station in the Dallas Area Rapid Transit (DART) system. Both installations experience frequent service disruptions from recurring break downs.

The use of escalators was considered for this option, but new WMATA design criteria limit the vertical rise for escalators to thirty feet, which would require numerous landings between banks of escalators where, in this option, the bottom landing would be extended a considerable distance beyond the upper platform.

Because of their slow rate of speed, high maintenance requirements, and the large number of inclined elevators that would be required to serve an entrance, the Inclined Elevator Entry Option is not recommended for further consideration.

**Table 17:** Forecast of station entries in 2020 under Inclined Elevator Entry scenario

| | ***No new entrance constructed*** | ***Inclined Elevator Entry constructed*** | |
|---|---|---|---|
| | ***Customers using existing entrance*** | ***Customers using existing entrance*** | ***Customers using Inclined Elevators*** |
| AM Peak Period | 5,900 | 3,700 | 2,200 |
| PM Peak Period | 9,300 | 4,500 | 5,000 |
| Daily | 22,000 | 12,300 | 10,100 |

***Wilson Boulevard Entrance Option***

The Wilson Boulevard Entrance Option features a station entrance at the southwest corner of Wilson Boulevard and Lynn Street. A new mezzanine-level tunnel would run northbound from the new entrance and would connect with the elevator bank proposed as part of the Middle Entrance option. Customers would use these elevators to access the upper platform.

Customers using the Wilson Boulevard Entrance would use the Middle Entrance elevators, so the Wilson Boulevard Entrance option can be considered only if the Middle Entrance option is constructed. Furthermore, the benefit provided by the Wilson Boulevard Entrance is small: Customers approaching the station from the south could use an underground walkway, approximately 400 feet long, to reach the Middle Entrance's elevator bank.

The Wilson Boulevard Entrance option would not significantly change the walking distance for pedestrian customers over the Middle Entrance option. However, some customers south of the station may perceive that they have a shorter walk, because they would enter the station sooner and walk in a passageway protected from traffic and the elements. Some new Metrorail trips from the south may be attracted by this advantage, but any increase in trips would likely be minor.

The Wilson Boulevard Entrance option is not as convenient to construct as the North Entrance option, because there is no planned redevelopment at the location of the proposed entrance portal. Retrofitting an entrance portal in an existing development may be feasible, but it would not be as easy to construct as the North Entrance option because of the planned Waterview development on that site.

Another disadvantage of the Wilson Boulevard Entrance option is that it would reduce the effectiveness of the Middle Entrance elevators. If the Middle Entrance were constructed alone, its elevators would stop at street level and at the upper platform level, a one-stop configuration that would maximize speed and capacity. The Wilson Boulevard Entrance would require the elevators to make an additional stop just below street level, delaying other customers. More elevators would be required with the additional stop.

Because of the limited benefit and the significant disadvantages, the Wilson Boulevard Entrance Option is not recommended for further consideration.